What Is Claimed Is:

1. A laser source for generating amplified and filtered optical output having high optical power with high spectral fidelity, the laser source comprising:

a VCSEL configured to generate seed light having a given spectral wavelength;

a power optical amplifier configured to receive the seed light generated by the VCSEL and amplify the seed light so as to generate amplified optical output having a given output power; and

a filter configured to receive the amplified optical output from the power amplifier and reduce background ASE from the power optical amplifier so as to generate the amplified and filtered optical output having high optical power with high spectral fidelity.

2. A laser source according to claim 1 wherein the VCSEL provides seed light having a side mode suppression ratio of greater than 20 dB and a line width of less than 100 MHz.

3. A laser source according to claim 1 wherein the given output power generated by the power optical amplifier is in a range of about 10 mW to 1 W.

4. A laser source according to claim 1 further comprising a thermoelectric cooler (TEC) in thermal connection with the VCSEL, wherein the TEC adjusts the temperature of the VCSEL so as to set the absolute wavelength of the seed light generated by the VCSEL.

5. A laser source according to claim 4 further comprising an additional thermoelectric cooler (TEC) in thermal connection with at least one of the optical amplifier and the filter.

6. A laser source according to claim 1 further comprising a thin-film tap and a photodetector disposed subsequent to the optical amplifier so as to monitor the given output power.

7. A laser source according to claim 1 further comprising an isolator positioned to receive the amplified

and filtered optical output therethrough so as to provide high optical return loss.

8. A laser source according to claim 1 further comprising power optical amplifier adjustment means for adjusting a given magnitude of electrical current applied to the power optical amplifier so as to control the given output power of the amplified and filtered optical output based on the given magnitude of the electrical current applied to the power optical amplifier.

9. A laser source according to claim 8 wherein the given output power of the amplified optical output is selected by adjusting the given magnitude of the electrical current applied to the optical amplifier independent of the given spectral wavelength of the seed.

10. A laser source according to claim 1 further comprising VCSEL adjustment means for adjusting a given magnitude of electrical current applied to the VCSEL so as to modulate the seed light from a particular spectral wavelength to the given wavelength and so as to control the

given spectral wavelength of the amplified and filtered optical output based on the given wavelength of the seed light.

11. A laser source according to claim 1 wherein the power optical amplifier is a semiconductor optical amplifier.

12. A laser source according to claim 1 wherein the seed light has a side mode suppression ratio (SMSR) of less than 30dB and a linewidth of greater than 10MHz.

13. A laser source according to claim 1 wherein the filter is a multi-cavity thin filter configured to reduce background ASE from the power optical amplifier by about 25 dB.

14. A laser source for generating amplified and filtered optical output having high optical power and having high spectral fidelity, the laser source comprising:

a first mirror and a second mirror forming a cavity therebetween;

an optical amplifier disposed in the cavity formed between the first mirror and the second mirror, the optical amplifier configured to generate ASE and amplify the power of the generated ASE between the first mirror and the second mirror; and

filter means for filtering the ASE generated and amplified by the optical amplifier to reduce background noise therefrom so as to generate the amplified and filtered optical output laser having high optical power and high spectral fidelity.

15. A laser source according to claim 14 wherein the first mirror is a wavelength selective mirror.

16. A laser source according to claim 15 wherein the wavelength selective mirror is a grating.

17. A laser source according to claim 16 wherein the second mirror is configured to selectively transmit the output to an optical fiber.

18. A system for generating amplified and filtered optical output having high optical power and high spectral fidelity, the system comprising:

an optical platform having a set of electrical connections and a fiber optic connection;

a VCSEL configured to generate seed light, and the VCSEL in electrical connection to one of the set of electrical connections of the optical platform;

an optical amplifier configured to receive the seed light generated by the VCSEL and amplify the seed light so as to generate power boosted ASE having a given output power, and the optical amplifier in electrical connection to one of the set of electrical connections of the optical platform; and

a filter configured to receive the power boosted ASE from the power amplifier and reduce background noise from the power boosted ASE so as to generate an output ASE having high spectral fidelity.

19. A method of generating optical output having high optical power with high spectral fidelity, the method comprising:

generating seed light from a low power source, the seed light having a given output power and a given spectral fidelity;

amplifying the seed light source from the given output power to an amplified optical output using a power optical amplifier, the amplified optical output having an adjusted spectral fidelity and an amplified output power, and the amplified output power being greater than the given output power of the seed light; and

filtering the amplified optical output produced by the optical amplifier to reduce background noise therein so as to generate the amplified and filtered optical output having high spectral fidelity greater than the adjusted spectral fidelity of the power boosted ASE.

20. A method according to claim 19 wherein the high spectral fidelity of the amplified and filtered optical output is substantially equal to the given spectral fidelity of the seed light produced by the low power source.

21. A method according to claim 19 wherein the high spectral fidelity of the amplified and filtered optical

output exceeds the given spectral fidelity of the seed light produced by the low power source.